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OCR A Level Computer Science

H446 – Paper 1

5

Web forms and JavaScript

Unit 5

Networks and web technologies

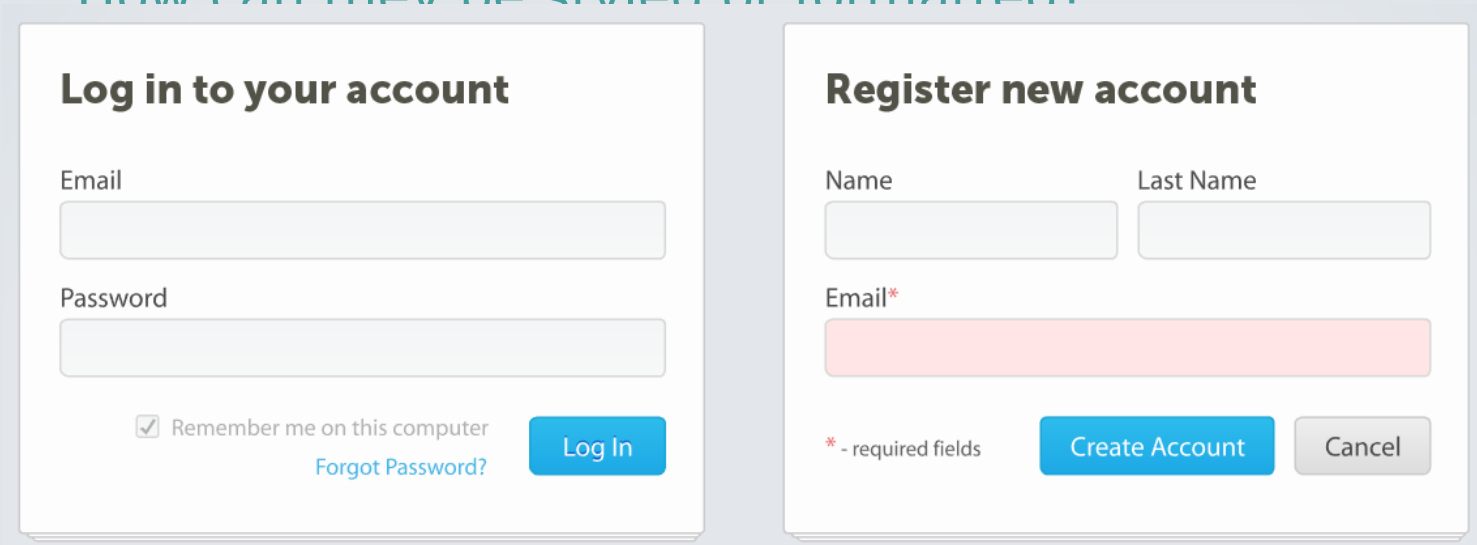
PG ONLINE

Objectives

- Be able to add HTML form controls to a web page
- Explain the role of JavaScript inside web pages
- Understand and follow JavaScript syntax
- Write basic JavaScript code for a given scenario
- Use JavaScript to change the content of HTML elements
- Create output, including alert boxes using JavaScript

Web forms

- HTML <form> tags can be used to create web forms
- These can be validated using JavaScript
  - How can they be styled or formatted?



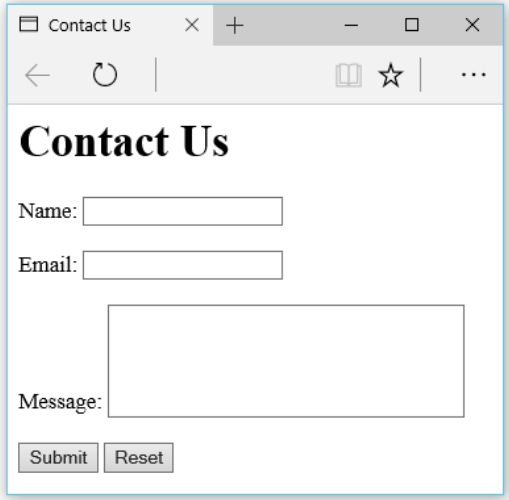
HTML form controls

- `<form>` tags
- Input types and names
- Submit and reset buttons
- Form actions

Example web form

- Form content is placed within <form> tags
  - Form objects have specific 'type' attributes
  - What would happen when the 'Submit' button is pressed?

```
<body>
    <h1>Contact Us</h1>

    <form action="MAILTO:contact@company.com" method="post"
          enctype="text/plain">
        Name: <input type="text" name="name"><br><br>
        Email: <input type="text" name="email"><br><br>
        Message: <textarea rows="5" cols="30" name="message">
                 </textarea><br><br>
        <input type="submit" value="Submit">
        <input type="reset" value="Reset">
    </form>
</body>
```



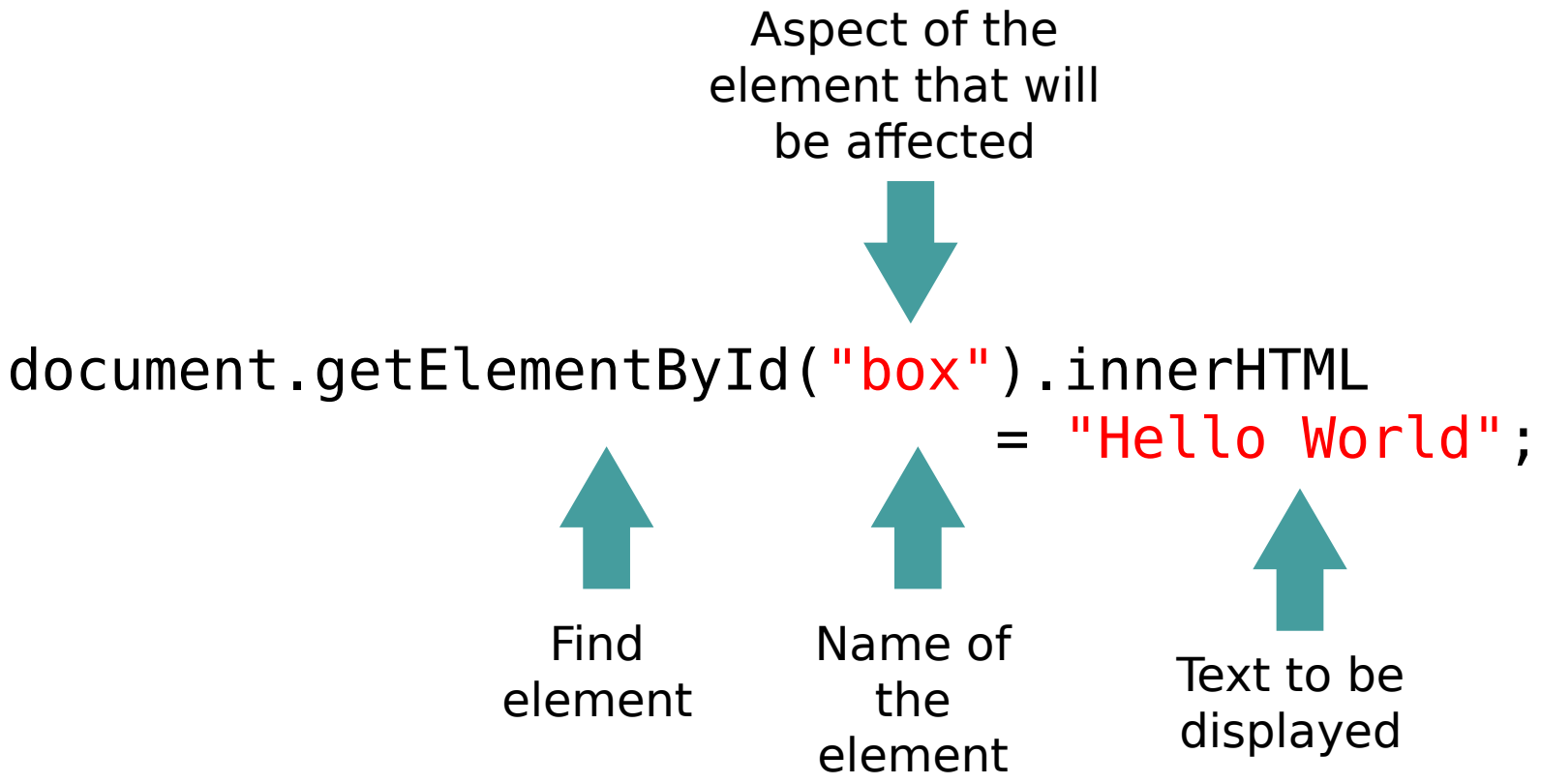
JavaScript syntax

- We can make a web form interactive by adding some simple JavaScript code
  - The code can be attached to an action such as a button click

```
<p id="box">Hello</p>

<button type="button" onclick=
"document.getElementById("box").innerHTML
= 'Goodbye'";
</button>
```

  - In this example, the script will look for a HTML element called ‘box’
  - Once it has been found it will change the element content to display “Goodbye”

Editing HTML elements with JavaScript



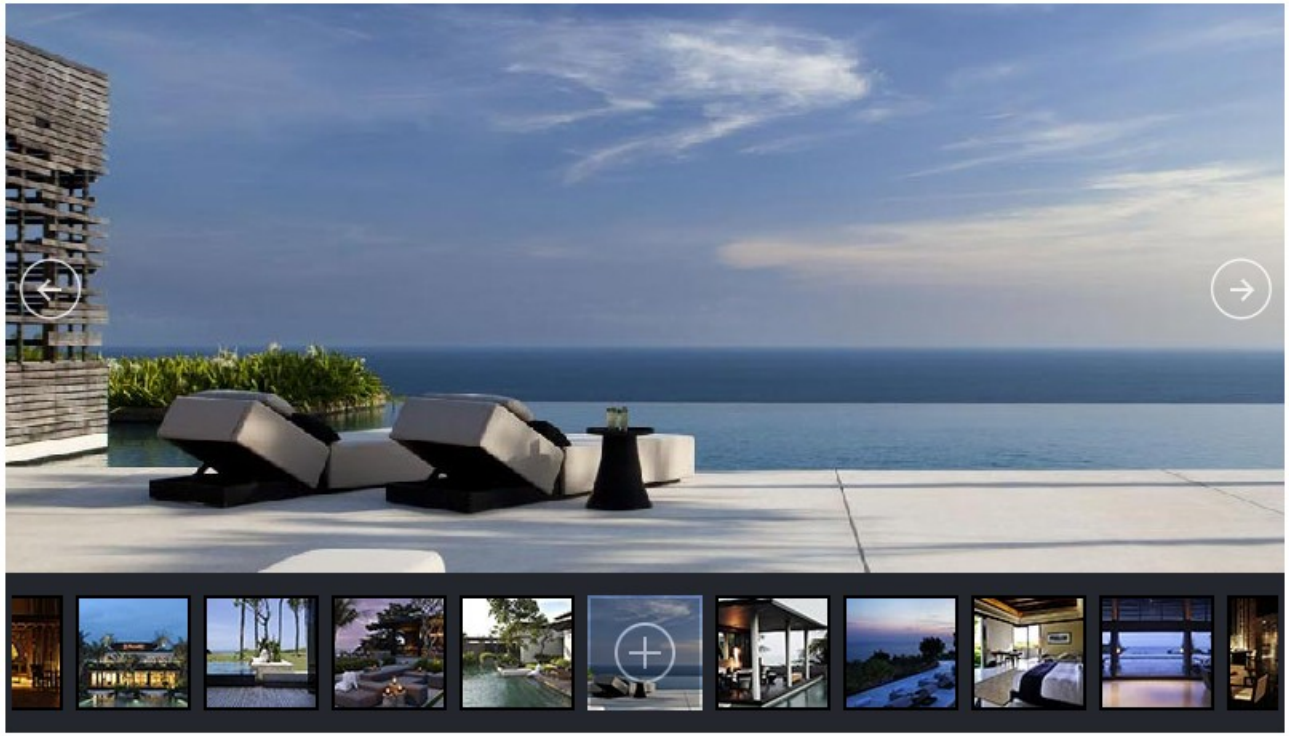
Worksheet 5

- The Tully Monster lived 300 million years ago
  - 50 million years before the dinosaurs
- Complete **Activity 1** on the worksheet

JavaScript

- One of the three essential web technologies alongside HTML and CSS
  - Used to program the behaviour of web pages
  - Adds interactivity between the user and a web page

Interactive web page features



- Interactivity improves the engagement of websites
  - What examples of interactivity can you think of?

JavaScript

- JavaScript is an interpreted language
- Why is it usually interpreted rather than compiled?
- Web features are simple to implement and:
  - allow complex tasks to be performed relatively easily
  - can execute ‘on the fly’ – does not need to compile
  - enable the addition of dynamic and interactive activities to web pages

JavaScript features

- Drawing and animations
- Manipulation of HTML elements such as text and images
- Navigation tools such as tabs and accordions
- Web form validation before transmission
  - Advanced usage includes full featured web apps, such as Netflix or the BBC iPlayer

JavaScript code structures

- Variables: assign, re-assign, and local vs. global scope
- Functions: group code into functions, pass arguments to them, and return values from them
- Conditionals: if/else statements and logical expressions
- Loops: while and for loops to repeat code
- Arrays: storing multiple pieces of data under a single variable

JavaScript code

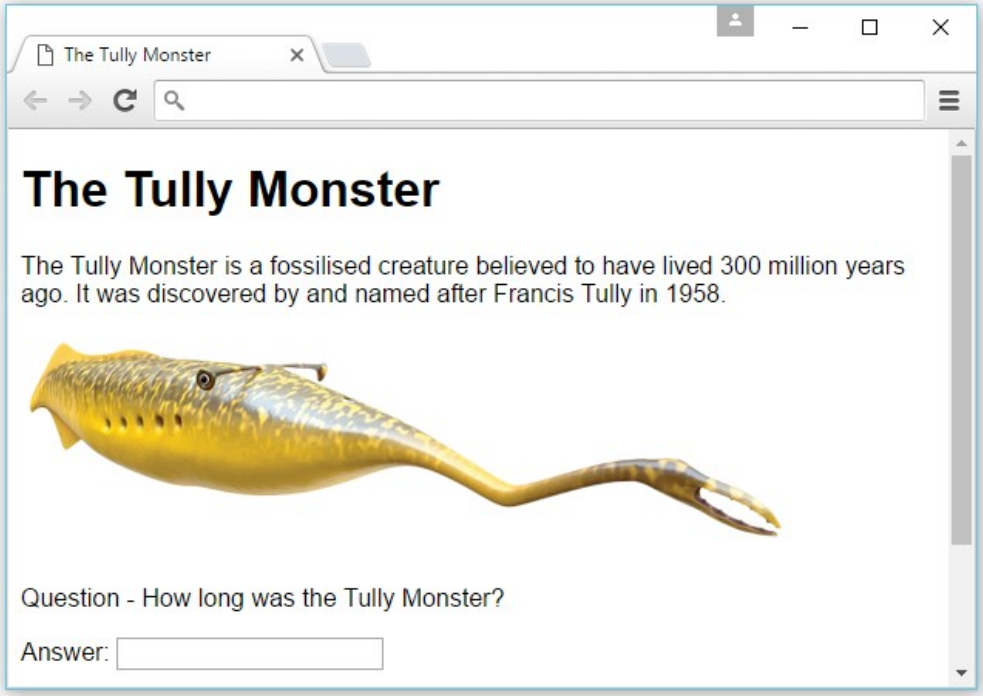
- JavaScript can be embedded directly into a webpage or within external script files linked to an HTML page
  - Embedding JavaScript directly (inline) minimises the number of files open at any time
  - Keeping an external .js file makes HTML code cleaner and easier to read
  - An external .js file can also be linked to multiple HTML files instead of replicating code.
  - Changes to a single external file can affect multiple HTML files

Input

- JavaScript is commonly used to process data on the user's machine as it is entered
- This may validate data, animate objects or provide other interactivity
- Once data has been processed, it may be passed on to a server
  - What are the advantages of processing data locally before sending it to a web server?

Form input controls

- Form `<input>` controls add textboxes to enter data



Variable syntax

- We can assign a variable using the following syntax

```
var x =
document.getElementById("box");
```

  - In this example we have created a variable called **'x'.**
  - The value for this variable is the HTML element 'box'
  - This means we can now address the element 'box' in JavaScript simply as the variable **'x'**

JavaScript variables

- We can now change the style of this HTML element by using some simple very simple JavaScript code as shown above.
  - What will this code do?

```
var x =
document.getElementById("box");
    x.style.fontSize = "30px";

    x.style.color = "blue";
```

JavaScript functions

- A function is a block of code that is designed to be repeatedly called
- Functions perform specific tasks that the user may wish to carry out multiple times
- Functions are executed once they are invoked and are otherwise idle in the background

Function syntax

- We can create functions in JavaScript using the following syntax
  - `<script>` tags denote the start and end of JavaScript code
  - A function is declared below called `myFunction` – function can use parameters, but for this course, no parameters will be used hence the empty parenthesis

```
<script>
myFunction()
 function myFunction() {
     var x =
document.getElementById("box");
     x.style.fontSize = "25px";
     x.style.color = "red";
}
</script>
```

Calling a function

- A function can be called using the `onClick` action of a button:

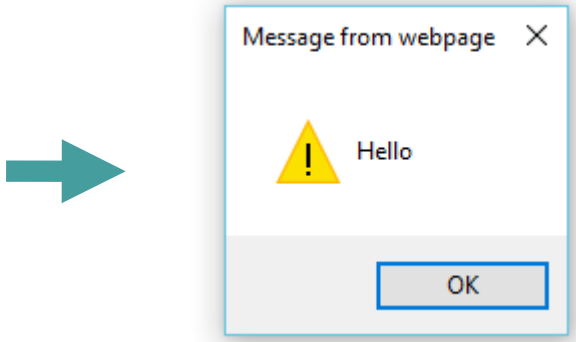
```
<button type="button"
onclick="myFunction()"> Click
Me!</button>

function myFunction() {
    var x =
document.getElementById("box");
    x.style.fontSize = "25px";

    x.style.color = "red";
}
```

- Every time the button is clicked, the **myFunction** function will be executed

Output Alert boxes

- Alert boxes can be implemented using simple JavaScript code
  - The easiest way to do this is inside a function

```
function Greeting()
{
alert("Hello")
}
```



Uses of an Alert box

- Why would a webpage have an alert box?
  - Sometimes it is an effective way of making sure the user conveys a piece of information
  - The alert box will often ask for confirmation and will not allow the user to continue interacting with the webpage

JavaScript - Input

- JavaScript can read and use user inputs from forms
  - A **variable** called **x** is declared and set equal to the **value** in the **'answer'** input box on the **'question'** form
  - What

```
<form name="question">
<p id="box">Question - How long was the Tully Monster?</p>
Answer: <input type="text" name="answer"><br><br>
</form>

<script>
function validate() {
    var x = document.forms["question"]["answer"].value;
    if (x == "") {
        document.getElementById("box").style.color="red";
    }
    else if (x == "35cm"){
        alert("Correct!");
    }
}
```

Validation and input

- Complete **Activity 2** on the worksheet

Writing to a file

- The write method can write some text directly into a web page:

```
<script>
document.write("TEXT TO BE
WRITTEN")
</script>
```

- It can also write HTML elements:

```
<script>
document.write("<h1> JavaScript
</h1>">)
</script>
```

Writing to a file

- This method is mostly used for testing purposes
  - It will delete the entire content of a HTML document after it has been executed
  - For this reason we must avoid using it as part of a function:

```
function myFunction() {
    document.write("Goodbye
World!");
```

Worksheet 5

- Complete **Activity 3** on the worksheet

Arrays

- Arrays can store multiple pieces of data under a single variable assignment
- An array in JavaScript uses the following syntax:

```
var colours =
["red.jpg","green.jpg","blue.jpg"];

var places = ["London","Sheffield","Dubai"];
```

  - The first array, `colours` contains three image files – red.jpg, yellow.jpg and green.jpg
  - The second array, `places`, contains three words – London, Sheffield and Dubai

JavaScript

- Look at **Activity 4** on the worksheet

Plenary

- Form controls frequently use JavaScript to function
- JavaScript can perform interactive functions and change the content of HTML elements
- JavaScript is a programming language that uses similar structures to other procedural languages

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